

REMARKS/ARGUMENTS

The application has been amended so as to place it in condition for allowance at the time of the next Official Action.

Previously claims 1-11 were pending.

This amendment cancels claim 4. This amendment also adds new independent claim 12. Claim 1 has been amended to include the recitations previously found in claim 4, for clarification, and to include disclosure found at least at specification page 5, lines 3-6.

There are no formal matters outstanding.

The Official Action rejected claims 1, 2, 4, 6, and 10 under §103 as obvious over MASUDA et al. 5,169,369 in view of TAKAGI (JP-1-247841).

The Official Action rejected claims 9 and 11 under §103 as obvious over MASUDA et al. in view of TAKAGI and in further view of MARUYAMA (EP-421804).

Applicants have carefully studied these references and believe that neither of the obviousness rejections are viable.

In making a proposed combination, the Examiner needs to be sensitive to the field of the invention (the relevant art), what the problems in the field of technology are, and what has already been done in certain aspects of this field.

The amended independent claims clarify certain features of the present invention and make explicit other features. For

example, it is explicit now that the invention is directed to a carrier consisting of two metallic endless band packages on which transverse metal elements are disposed freely moveable in a longitudinal direction of the band.

As acknowledged by the Official Action, MASUDA et al. do not anticipate the present claim. Further, MASUDA et al. do not anticipate the new recitation of the projection and recess extending over the entire width ("dimension in horizontal direction") of the middle ("second") part of the transverse element.

As to the secondary TAKAGI reference, this secondary reference fails to teach any of:

the transverse element and tensile belts being both produced in metals;

a tilting line present below a protrusion and a recess part;

the lower part of the element being tapered; and

the protrusion and recess as taken in side elevation being tapered, that is at least the elements are freely moveable in the longitudinal direction.

In view of the shortcomings of these two references, applicants believe it is clear that they cannot be combined in such a way as to result in the presently recited invention.

Consider the object of the present invention which is to ease the manufacture of transverse elements while maintaining their functionality. Transverse metal elements for push belts are up to now commonly produced by way of fine blanking since amongst many other conceivable ways of producing, it has been from the outset (see e.g. BEUSINK 3,949,621) been clear, and over time been proven to be the most economical, reliable, and fastest process. There are problems associated with this process, as mentioned in the introductory part of the specification (page 2, line 30 - page 3, line 2), relating to the amount of material required around a projection and recess to be blanked, the additional power required therefore at blanking, and the risk of deformation of the elements at incorrect conditions of blanking.

The required amount of force at blanking relates to the quality thereof (i.e., to the detriment thereof), which should be ultimately high in respect to the dimensions of the respective functional parts with a transverse element of a push belt. To further indicate the type of problems associated with blanking, applicants therefore in addition to the BEUSINK patent refers to SATO (JP 63-57942). SATO implicitly deals with this matter and suggests to provide the area around the projection with a thickness lower than the thickness further away from the projection.

Applicants have discovered a solution to this problem that includes to at least partially provide the projection and recess in the middle part of the element, and to extend the projection over the entire width of the second part. The projection and recess may, especially in combination with the features of pending claim 6, also be located entirely in the second area, as will be discussed below.

The features of the solution solving the problem of withdrawing surrounding element material at blanking, and consequently that of weakening of breakage of the element, and the problem of required force in that by the measures according to the invention:

1. no, or considerably less material needs to be withdrawn from the transverse direction; and

2. the deformation is easier to perform when performed at least partly within the middle element and over the entire width, since it is easier for the element to provide the material required for the deformation from either the upper or lower part of the element.

This latter effect may even be made larger when a strip of material from which such elements are commonly blanked are in advance provided with a gutter, e.g., simply provided by rolling instead of fine blanking, within the area of the middle part 12 of the element. Should such a gutter be made partly within the

lower part, then no dedicated provision should be present to maintain a boundary for amount of axial freedom of movement between neighboring elements.

Although it is known from SMEETS (0 976 949) to use the axial play between element and tensile means to limit such mutual axial movement, it is accordingly to a further aspect of the invention, for technical and economical reasons preferred not to process the lateral sides of the middle part for such purpose. Rather, when applying the projection entirely in the second part, either by blanking or by advance rolling, the present invention, in addition to the main solution provided, suggests applying the solution according to claim 6. The latter would take away part of the greater advantage to be achieved when the projection is located entirely in the second part, however, this may be preferable over known methods.

Thus, the invention provides a structure that maintains the functionality of the element while improving the manufacturing features. This is achieved by the limitation in width of the projection by the width of the middle part, and the partial presence of the projection in the lower part, providing the preferred limitation in axial mutual moveability.

As to the MASUDA et al. reference, note that there is no discussion as to the reproducibility of the element

(manufacturing element). Accordingly, this reference teaches nothing as to solving problems concerned with the problem at blanking.

However, should nevertheless the document be taken for the reason of contemplating alternative shapes of projections, it should be noted that MASUDA et al. suggest that different shapes of a projection would be contemplated (column 9, lines 53-56). However, the reference fails to teach or suggest the idea according to the present invention to stretch the projection over the entire width of the second part. Rather, in fact the reference discloses to have either a half-circular projection (80, 82) located to a lateral side of the middle part of the element or to have an oval or circular projection (110, 111) in the center thereof. Thus, MASUDA et al. point both at the location and the shape of projections being either half-circular, circular rectangular, oval and elliptical. The teachings suggest a shape of a confined object rather than a semi endless shape as in a projection extending from lateral side to lateral side as in the present invention. Accordingly, although the reference teaches alternative shapes are possible, it does not suggest extending the shape fully across the width of the second part.

Further, there is no teaching in MASUDA et al. to extend the projection down into the lower first part. Therefore, the successive steps necessary to move from the structure of

MASUDA et al. to that of the present invention is not believed to be supported by the teachings of the applied art.

Further, the combination of MASUDA et al. and TAKAGI is not believed to be viable. In considering the TAKAGI teachings, one must consider the nature of the belt for which the TAKAGI element is designed, and given the actual difference in features.

It would particularly not be obvious to make such combination since the notice of integrating the projection with the tilting line of the element conflicts with the goal to seek a solution for a design in which these parts are in purpose kept separate. Since the design of TAKAGI evolves from the desire to longitudinally interlock mutual transverse elements, it is believed evident that the transverse openness of the projection and recess of TAKAGI is naturally associated with the requirements to assemble the elements into a chain. Accordingly, TAKAGI would not teach a structure which would create and allow the elements to be freely moveable in the longitudinal direction.

Further, TAKAGI does not deal with the problem of manufacturing or suggest any structural features that would aid in the noted manufacturing problems. Rather, the TAKAGI design appears to be adapted for being produced by injection molding processes associated with rubber and synthetic belts. Indeed, it appears that the TAKAGI design would pose immense problems with metal belts and elements in that the shape may not be produced by

a blanking process. Rather, a metal casting process would be required and such a process is not likely.

Accordingly, the TAKAGI teachings are not believed to be relevant to a driving belt comprising metallic endless band packages and transverse metal elements.

For these reasons, the obviousness rejections are not believed to be viable.

Accordingly, reconsideration and allowance of all claims are respectfully requested. The dependent claims are believed to be allowable at least for depending from an allowable independent claim.

Entry of the above amendments is earnestly solicited. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 25-0120 for any additional
fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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